Technology Development News

Exploring The State Of The Art For The State Of The Practice

WESTERN FEDERAL LANDS HIGHWAY DIVISION

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Enhancing Safety and Mobility in Rural America

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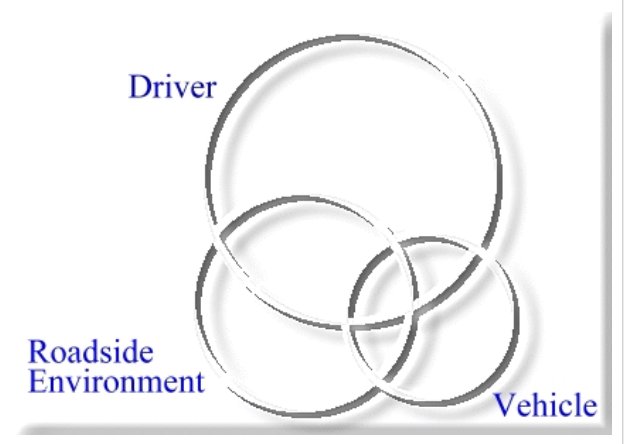
The Penn State University Research complex in the Happy Valley of Central Pennsylvania was the site of the Rural Advanced Technology & Transportation Systems 1998 International Conference. Over 400 participants met at the Penn Stater Conference Center for presentations and discussions about rural applications of Intelligent Transportation Systems. The theme of the conference, "Enhancing Safety and Mobility in Rural America", focused on the critical contribution of rural transportation to the economic development of Rural America and the overshadowing safety needs of rural roads.

Recent statistics identify three principal causes of rural highway crashes, Driver Error, Roadside Environment, and Vehicle Systems. About 22% of the Driver Error crashes are caused by unsafe speed, but 40% occur on straight roads indicating that inattention or fatigue play a role, while 16% involve younger or older drivers usually indicating judgement errors. About 24% of crashes classified as Roadside Environment identified weather as a cause, while 13% of the roadside incidents are in work zones, and 5% are collisions with animals. Vehicle Systems are less frequently identified as a crash cause and usually relate to improper maintenance.



ITS can address Driver Error with warning systems, such as radar linked speed signs, variable speed limit systems, fatigue detectors, position sensors and driving simulators. The Roadside Environment can be addressed with night vision technology, variable message signs and intrusion systems. Rural ITS can also improve detection and notification using May-Day Systems, call boxes with cell phone or

Low Orbit Satellite technologies and enhancing alert or dispatch of emergency services. Many manufactures are addressing Vehicle Systems and these improvements will need to interact with some roadway systems. These systems are critical to rural travelers during the first "golden hour" after severe incidents because safety improvements are more difficult to achieve in rural areas.

Six targets have been identified for development of Rural ITS over the next five years.

- Connect Regional Information Networks to Statewide planning efforts.
- Improve detection, notification, and response time of Emergency Services.
- Coordinate Mobility Services to enhance transit dispatch service.
- Use spot warning and variable speed systems to improve crash prevention
- Use portable and permanent systems for rural traffic management.
- Provide traveler information for pre-trip planning, reservations, and route updates.

A National Architecture has been developed to help coordinate efforts to achieve these targets during planning, and assure connectivity across jurisdictions.

Systems are being developed and deployed as pilot technologies to address many of these target issues. For example, crash detection may improve with automatic collision notification systems, either on-board vehicles or along roadsides. Enhanced 911 will improve notification, response time, and provide cross-jurisdictional operation. Also, video and enhanced signal systems at railroad/highway grade crossings may provide advance notice of potential conflicts to locomotive operators and motorists .

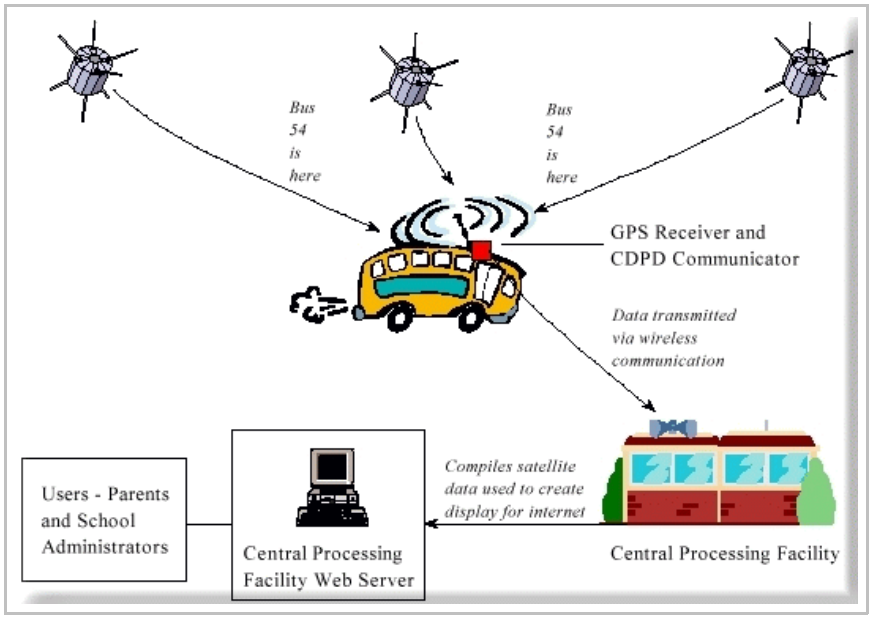
"Smart" signs are being demonstrated at RR/highway crossings and in school busses. Similar technology is being tested for warning signs at remote, limited visibility traffic intersections. Oak Ridge National Laboratory is working on detection and warning devices for use in "low boy" trailer configurations at steep profile "humped" RR/highway crossing surfaces. Several destination sites are conducting operational tests of traveler information systems for regional attractions.

Rural MAYDAY systems are emerging as critical safety technology. Driven by the FCC requirement that cellular technology must be capable of locating a caller's location within a few meters, future MAYDAY systems will use this geopositioning, much like enhanced 911, to locate incidents where an errant vehicle has triggered an on-board incident detection system. This technology will greatly improve the current rates of detection and response. Currently it takes 15 minutes to notify 911 in injury accidents and 31 minutes in fatal accidents. Rural emergency response arrival time to the scene routinely takes 60 minutes. Using technology to improve detection, notification and response could shorten these times, bringing initial medical intervention during that "golden hour" closer to reality for rural crashes.

A key technology for rural sites is Advanced Road Weather Information Systems (ARWIS) which is becoming more prominent in many regions, especially those with diverse climate and severe changes. There are several private third party providers of weather data, usually through the Internet, which have user-friendly access to real-time and historic data. Co-ops are also forming to share collective weather data for redistribution over the Internet. Distribution is also provided at rest areas and tourist

information centers in Kiosks, in hotels and motels using WebTV, by pager service and by fax. The ARWIS data is fed into forecasting models which predict road conditions or advisories for these distribution centers. Networks of ARWIS are being established in several States to report real-time weather and road condition status for use by maintenance forces, enforcement officers, and road users. In-vehicle sensors, usually infrared technology, are being tested to contribute real-time data to supplement ARWIS with wide area information, increasing the roadway coverage area.

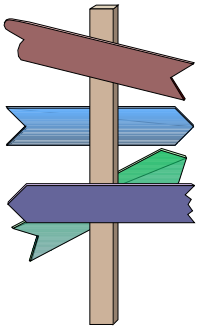
Coordination of mobility services to enhance transit and to coordinate dispatch of service providers can improve rural mobility. ITS technology allowing for computer PC-based trip dispatching and management systems for rural transit and paratransit fleets can improve efficiency of the service and benefit the rural population. Automatic vehicle location systems, real time passenger information, communications using the Internet, automated accounting and billing systems, and in-vehicle computer terminals can be useful in serving certain rural areas. Enhanced transit service can increase the mobility of rural residents unable to drive to obtain provisions and medical or employment opportunities. These enhanced service providers can improve efficiency, provide timely response, more quickly locate users, and make delivery on schedule using geopositioning with digital maps, enhanced caller identification, and advanced route scheduling techniques.



Enhanced traveler information can contribute to the local economy by bringing in tourist, improving guidance to local attractions or events, reducing visitor delay and frustration for those unfamiliar to the area, and assisting with access to motorist services, such as food, lodging and repairs. Because traveler information is valuable, there may be economic opportunities for cost sharing to make this service more cost feasible.

The six Rural ITS target areas developing over the next five years will deploy and demonstrate the safety and economic benefits these systems can offer the rural traveler. Although we and our customers may not be the owners or operators of these systems, we will be incorporating them into our projects to provide seamless access to information by the ultimate users, the traveling public. We must be willing to integrate Rural ITS technologies with our customers and out lying jurisdictions to enhance the travelers' safety and mobility.

ROAD SIGNS



"The most exciting phrase to hear in science, the one that heralds the most discoveries, is not 'Eureka!' (I found it!) but 'That's funny...d'"
-Isaac Asimov

We wish to thank all the individuals who have contributed articles for previous newsletters. If you are aware of a new technology, (or a fresh spin on an old one) please jot down your ideas and submit them via e-mail to me at the address below. Or, if you have an aversion to writing, just donate 15 minutes of your time for an interview (either by phone or in person), and I'll format the information for you. You can then review the article for accuracy (via e-mail or hard copy) and upon publication, you'll become famous in a matter of days. Remember, although we cater to road-related technology, ANY new technology information is welcome.

Please send all submissions to Kristi Swisher - (360.696.7572). Be sure your name, title, and phone number are the way you want them to appear in the article. Articles are subject to editor/ layout approval and may be condensed if space is limited.

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